

PV Grid-Tied Inverter

ShiniCube 1600TL | 2200TL | 2800TL | 3300TL



User Manual

- Installer
- Operator
- Maintainer

Instruction Manual

About Victory Power

Thank you for use the photovoltaic grid-tied inverter from the research, development and manufacture of Victory Power.

Victory Power, a high-tech enterprise in the new energy industry, is mainly engaged in the supply of perfect power source inverting products and technical services for solar photovoltaic power generation, wind power generation and renewable energy power generation system, and the products and services are mainly used in the renewable energy grid-tied power generation system, off-grid village power supply system and private power supply system.

For readers

This manual is applicable for technicians of inverter installation, operation and maintenance. The reader shall be familiar with electrical knowledge.

About this manual

Please carefully read through this manual before using the product. This manual shall be well kept in a place easy for using. Persons to operate the product as per this manual must be a qualified electrical engineer certified by the local electrical authority.

Copyright

The copyright of this manual belongs to Wuxi Victory Power New Energy Technology Co., Ltd. No part or the entire of this manual can be reproduced in public without a written permission.

Because of the continuous product upgrading, this manual will be updated correspondingly, and thus there will be some unconformity between the manual description and the product, and the user can acquire the most updated version from www.victorypower.com or Victory Power will not be responsible for informing the user of manual updating.

Applicable models

This manual provides the instruction for the installation, operation and maintenance of photovoltaic grid-tied inverters ShiniCube1600TL-ShiniCube3300TL. The following models of inverter are related:

- ShiniCube1600TL
- ShiniCube2200TL
- ShiniCube2800TL
- ShiniCube3300TL

Revision

Revised version No.	Date	Description
VP-UMSC1.0.0EN	2011.09.19	Rev. 1

Important safety instruction

Symbols in this manual

To ensure the personal and property safety in using the photovoltaic inverter and the high efficiency of the product, related safe operation notices are provided in the manual, and corresponding symbols are used for emphasizing the importance. These important notices must be fully understood and followed. Symbols used in this manual are listed below to help you carefully read and use this manual.



Danger

It means a highly potential danger which may cause a serious personal injury or death directly if this warning is neglected.



Warning

It means a moderately potential danger which may cause a serious personal injury or death directly if this warning is neglected.



Caution

It means a lightly potential danger which may cause a light or moderate personal injury or serious property loss if this warning is neglected.



Notice

It means a potential risk which may cause device malfunction or property loss if this warning is neglected.



Tip

It means an additional notice emphasizing or complementing the content, or providing a tip for optimizing the product operation, and further help you solve some problem or save some time.



Instruction

It means a helpful reference or notice.

Symbols on the inverter

The inverter is attached with some labels related to operation safety. Please don't install the device before carefully read through and fully understand these labels.

	It means there is still residual voltage in the inverter! The capacitor is still electrified after the AC/DC side of the inverter is cut off, so the inverter cannot be maintained within 10min till the capacitor is completely discharged.
	Danger of high voltage and electric shock!
	Danger of high temperature and burn injury!
	Earth line!
	The wasted product must be sent to the authorized collecting center.
	Please carefully read through and fully understand the instruction manual before using the product.
	Certified by Australia AS4777.
	Acceptable in the test of insulation and voltage resistance.
	Acceptable in the functional test.
	Acceptable in the quality inspection.

Contents

1

Safety instruction.....

1

1.1

Before installation.....

1

1.2

During installation.....

2

1.3

Operation.....

2

1.4

Repair.....

3

1.5

EMC.....

3

2

Product description.....

4

2.1

Product applicability.....

4

2.2

Circuit structure.....

4

2.3

Product introduction.....

5

2.3.1

Electrical connecting part.....

5

2.3.2

Dimensions and weight.....

6

2.3.3

LCD Displaying panel.....

6

2.3.4

Product label.....

7

3

Installation.....

8

3.1

Safety instruction.....

8

3.2

Installation procedures.....

8

3.3

Preparation before installation.....

9

3.3.1

Unpacking and check.....

9

3.3.2

Preparation for tools.....

10

3.4

Selection for a installation position.....

10

3.5

Inverter installation.....

12

3.5.1

Installation on a wall.....

12

3.5.2

Installation on a support.....

13

3.5.3

Optional anti-theft lock.....

14

3.6 Electrical connection..... 15

 3.6.1 Electric and electrical system structure..... 16

 3.6.2 Structure of the communication system..... 16

 3.6.3 Wiring terminals and cable specification..... 19

 3.6.4 Steps for electrical connection..... 21

 3.6.5 Earthing requirement..... 28

4 Trial operation..... 29

 4.1 Check before operation..... 29

 4.1.1 Check for reliability of mechanical installation..... 29

 4.1.2 Check for connecting cables..... 29

 4.1.3 Electrical check..... 29

 4.2 Electrify the inverter..... 29

5 Human-machine interaction..... 30

 5.1 LCD interface..... 30

 5.2 Internal data storage..... 31

 5.3 Introduction to the function of monitor software..... 32

 5.3.1 Main interface..... 32

 5.3.2 Device management..... 32

 5.3.3 Data review..... 32

 5.3.4 Parameter setting..... 33

 5.4 Inverter working mode..... 33

 5.4.1 Standing-by state..... 34

 5.4.2 Power generating state..... 34

 5.4.3 Protection state..... 35

 5.4.4 Fault state..... 35

5.4.5 Fault state.....	36
5.4.6 Sleeping state.....	36
5.5 LCD panel power saving mode.....	37
6 Troubleshooting and maintenance.....	38
6.1 Troubleshooting.....	38
6.2 Daily maintenance.....	41
7 Uninstallation.....	42
7.1 Uninstalling steps.....	42
7.2 Packing.....	42
7.3 Storing.....	42
7.4 Solution at the termination of service period.....	42
8 Technical parameters.....	43
9 Quality assurance.....	45
9.1 Quality assurance.....	45
9.2 Rights.....	45
9.3 Exception clause.....	45
9.4 Quality assurance card.....	46
10 Contact Victory Power.....	47
10.1 About Victory Power.....	47
10.2 Contact Victory Power.....	47

1 Safety instruction



Tip

Please contact Victory Power if you encounter some puzzle in reading the following information.

ShiniCube inverters are designed, manufactured and tested as per international safety standards. However as an electrical and electric product, it must be installed, operated and maintained strictly according to related safety notices.

Please contact the nearest authorized maintenance center or Victory Power if you need to maintain or repair the product. Please never repair the product by yourself, or there may be some personal injury or property loss.

Please don't start to install or debug the device before fully understand all the instruction in the manual and get familiar with all safety symbols in each paragraph.

Victory Power will take no responsibility for any personal injury or property loss caused by any misoperation.



Warning

Misuse or misoperation may harm:

- The personal safety of the operator or a third person;
- The property safety of the inverter or any other property.

1.1 Before installation



Warning

The inverter cannot be connected to the grid unless approved by the electrical authority, and it must be installed according to the local standard and related standard for an electrical enterprise.



Notice

Please check if the inverter is damaged during transportation when you receive the product. If you found any defect, please contact Victory Power and the transportation agency immediately.



Notice

The inverter has electromagnetic radiation, so it is not suitable for installing in the bedroom or living room, etc. Please choose a suitable place for installation.

1.2 During installation



Danger

Please cover the photovoltaic battery board by lightproof material or cut off the DC circuit breaker before electrical connection. A dangerous voltage will be generated by the photovoltaic array exposed in the sunshine.



Danger

Cables in the photovoltaic power generation system must be firmly connected, well installed and with suitable specification.



Warning

The output voltage from the array cannot exceed the maximum input voltage of the inverter. A higher input voltage may irreversibly damage the inverter or cause some other loss, and Victory Power will have right to take no responsibility for quality assurance or any joint and several liability in this case.



Notice

The inverter must be installed by a qualified electrical engineer certified by the local authority, and the installation manual must be read through before installation.



Notice

It must be installed according to the local standard and related standard for an electrical enterprise.

1.3 Operation



Danger

- The high voltage circuit in the inverter is dangerous for life safety!
- This product must be installed in the place away from any child access.



Danger

- There may be an electric shock or fire risk if touching any contact or terminal in the grid or device;
- Please pay attention to all instruction or safety notices for grid connection.



Danger

A damaged device or a system fault may cause an electric shock or fire risk.

- Please visually check if the device is damaged or containing any other danger before operation;
- Check if all external devices and circuits are safely connected. Make sure the device is safety before operation.



Caution

- Please take care against burning injury if touching a running inverter;
- Only the display screen of the inverter can be touched during operation.

1.4 Repair



Danger

- Cut off the electrical connection between the inverter and the grid and then cut off the DC electrical connection before repairing.
- No repair work can be performed within 10min until the internal elements are fully discharged



Notice

The inverter cannot be restarted unless any fault influencing the inverter safety performance is immediately removed. Please contact the local authorized maintenance man or Victory Power if you need to repair the inverter.



Notice

Please never dismantle any internal element of the inverter, or we will take no responsibility for quality assurance or any joint or several liability for the loss.

1.5 EMC

EMC (Electro Magnetic Compatibility) means the resistance of a device or system against generating any electro magnetic interference to the environment without influencing the normal operation in the electro magnetic environment.

- Immunity to the own noise: immunity to the internal electrical noise;
- Immunity to the external noise: immunity to the external electro magnetic noise;
- Noise radiation level: influence of electro magnetic radiation to the environment.

ShiniCube is researched, developed and manufactured as per the related international standard, and the electro magnetic radiation level is very low, but as an industrial product, it is still important to control the electro magnetic radiation.



Notice

- The electro magnetic radiation of the inverter is harmful for health;
- Please never stay within 20cm from a running inverter for long.

2 Product description

2.1 Product applicability

By the ShiniCube grid-tied inverter, the DC voltage generated in the photovoltaic array can be transformed into AC voltage supplied to the grid. The photovoltaic power generating system consists of photovoltaic arrays, inverters, meters and a power grid.

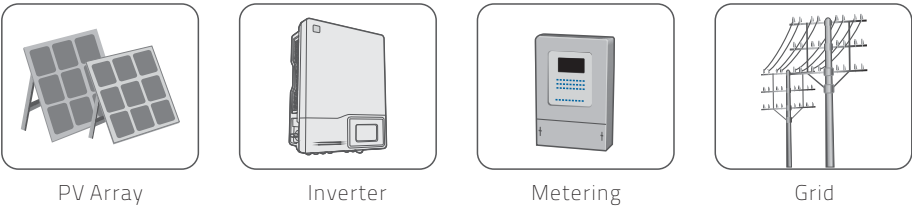


Fig. 2-1: Photovoltaic grid-tied power generating system

The research, development and manufacture of ShiniCube inverter are integrated with the most updated techniques and public confirmed safety regulations. However, misoperation may still cause personal injury or property loss.

The inverter must be reliably connected to the public power grid. This inverter is not designed for any moving application.

This inverter cannot be used for any other or additional purpose. For any loss caused by using in any undersigned application, the manufacturer and supplier will take no responsibility. The user will bear the loss from any undersigned application by himself. Instruction in this manual must be followed for the designed application.

2.2 Circuit structure

Fig. 2-2 shows the internal functional diagram of ShiniCube inverter. After the photovoltaic input enters the voltage boosting circuit via the filter circuit, the input DC voltage is boosted and stabilized to the value for the full-bridge inverter circuit, and in this process, the MPP tracer in the inverter will ensure the DC energy generated in the photovoltaic array can be used by the inverter circuit at maximum.

The DC voltage is transformed into AC voltage by the full-bridge inverter circuit. CPU1 and CPU2 control the inverter operation and monitor the operation state, and in any abnormal working condition the internal relay of the inverter can be cut off to protect the inverter, external devices and personal safety.

CPU1 and CPU2 control relay 1 and relay 2 respectively, and thus the system reliability is highly improved.

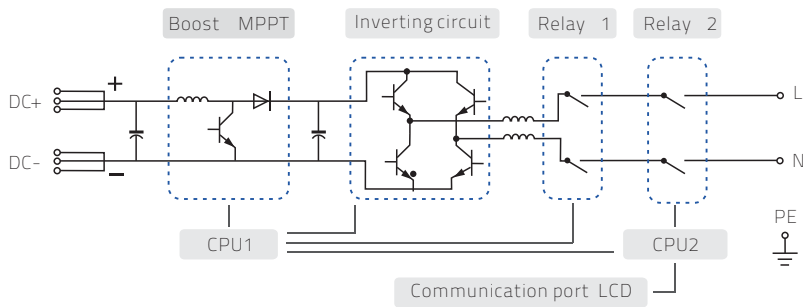


Fig. 2-2: Schematic diagram for the main circuit

2.3 Product introduction

2.3.1 Electrical connecting part

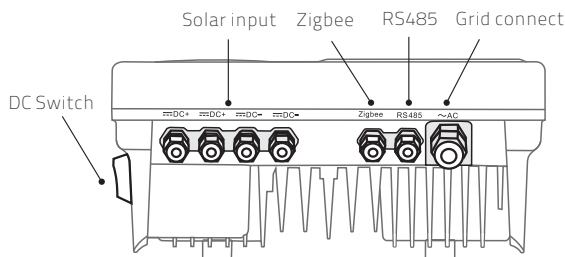


Fig. 2-3: Schematic drawing for the electrical connecting part

Tab. 2-1: Description for the electrical connecting part of the inverter

Name	Description
Solar Input	Two pairs of terminals connecting the photovoltaic assembly
Zigbee	External optional Zigbee wireless module
RS485	Standard communication mode
Grid Connect	Connected to the grid
DC Switch	Optional DC switch



Instruction

A DC switch is recommended in consideration of safety. In some countries, there is imperative requirement for the connection of photovoltaic assembly and inverter, so the user can select an applicable ShiniCube inverter to satisfy the requirement.

2.3.2 Dimensions and weight

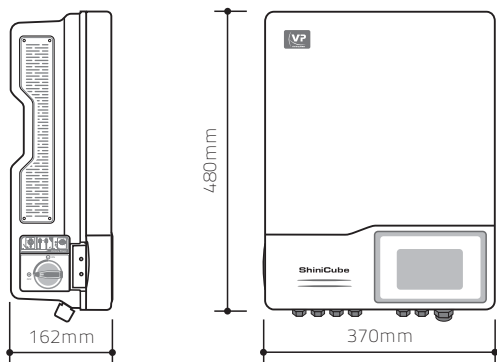


Fig. 2-4: Inverter dimensions

**Notice**

Waterproof I/O terminals are located at the bottom of the inverter, so care must be taken in handling and installing the inverter to protect these terminals from damage.

Tab. 2-2: Inverter weight

Model	ShiniCube1600TL	ShiniCube2200TL	ShiniCube2800TL	ShiniCube3300TL
Weight	20Kg	20Kg	20Kg	20Kg

2.3.3 LCD Displaying panel

The inverter works automatically without any user's operating or interfering. The basic working state including the generating capacity is displayed on the LCD displaying panel. The inverter displayer is a sound controlled LCD, and it will be turned off and enter the power saving mode if there is no operation within 2min and will be turned on again by clicking the inverter shell slightly.

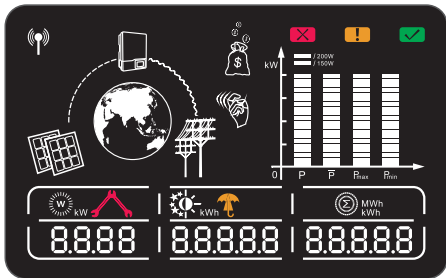


Fig. 2-5: Inverter LCD displaying panel

2.3.4 Product label

The product label, attached to the right side of the inverter, contains the basic information of the inverter. Please pay attention to the inverter model and technical parameters.

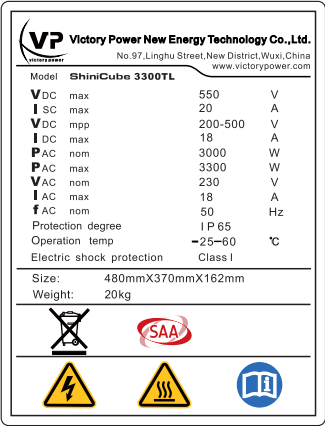


Fig. 2-6: ShiniCube inverter label

3 Installation

3.1 Safety instruction



Danger

The DC voltage at the photovoltaic array side and the AC voltage at the grid side are both higher than the safe voltage. It is forbidden to touch any electrified terminal directly. Make sure the DC side is not electrified before installation and maintenance.

The inverter must be installed, operated or maintained as per the following standard and instruction, and it cannot be connected to the grid for power generation unless approved by the local power supply authority, and all operation must be performed by a qualified electrical engineer.

- All electrical installation must be performed according to the local standard for electrical installation;
- No internal part except the wiring terminals can be touched during installation;
- A running inverter has a high voltage, so no internal operation can be made within 10 min at least after the AC and DC power supply of the inverter is cut off and it is made sure by measuring the DC voltage by a multimeter that the capacity is fully discharged;
- Take care of the hot surface of the inverter. E.g.; the heat radiator of the power semi-conductor will be kept in a high temperature after the inverter is shut down;
- The inverter is delivered without any user's self-maintenance assembly, so please contact the local authorized installation and maintenance man if you need to maintain your inverter.

3.2 Installation procedures



Fig. 3-1: Installation procedures for the inverter

See the following instruction for details.

3.3 Preparation before installation

3.3.1 Unpacking and check

The product is carefully tested and checked before transportation, but it is still possible to be damaged during transportation, so please check the device again before installation. If any damage is found, please contact the transportation agency or directly contact WuXi Victory Power New Energy Technology Co., Ltd. Please provide us photos of damage, and we will feed back the fastest and best service.

Please never dispose the original package of your own accord. Check if the delivery is completed according to the package list. The delivery contains the following items:

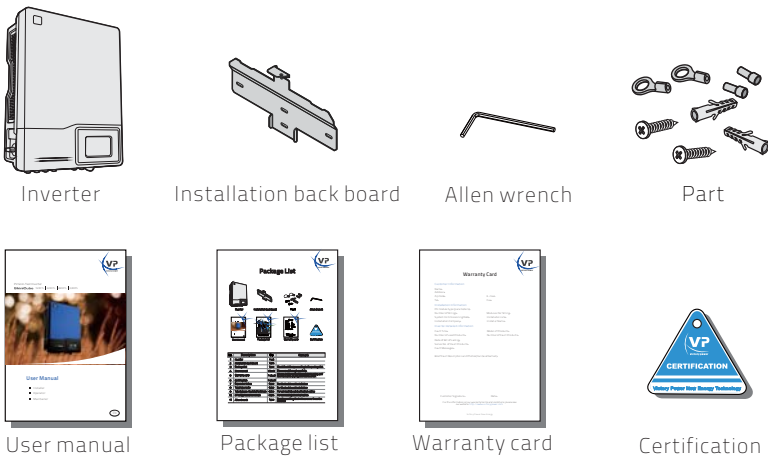


Fig. 3-2: Items in the package

Tab. 3-1: Package list

No.	Description	Qty	Remark
1	Inverter	1 set	
2	Installation back board	1 pcs	
3	Package list	1 pcs	Check the delivery according to the package list.
4	User manual	1 book	Please read through carefully.
5	Warranty card	1 sheet	Please well keep for filling and returning us if there become any fault in the inverter.
6	Certification	1 sheet	
7	Expansion tubes	6 pcs	For the back board installation
8	Tapping screws	6 pcs	For the back board installation
9	Tube type pre-insulated terminals	8 pcs	For connecting communication cables
10	OT cold pressed terminals	8 pcs	For connecting electrical cables
11	Allen wrench	1 pcs	For dismantling the bottom cover from the inverter

3.3.2 Preparation for tools

The following tools will be used for installing the inverter:



Φ 6 percussion drill



Press pinchers



Screw driver and wrench



Multimeter



Hammer

Fig. 3-3: Tools for installation

3.4 Selection for a installation position



Danger

Some parts (e.g.: heat radiator) of the inverter runs with a high temperature, so it is not suitable for installing near inflammables or explosives.



Notice

- When selecting an installation position, please avoid the influence of noise and electro magnetic radiation to the environment;
- The inverter cannot be installed near any place of high external electro magnetic radiation (e.g.: a TV tower, communication signal tower or HV cables).



Notice

The inverter performance will be degraded if the environmental temperature is 45°C above. Make sure the inverter is installed in a well ventilated place so that the power generation can be maximized.

Detailed requirement for the installation position:

- ※ The inverter with a protection level of IP65 can be installed in the open air;
- ※ The inverter cannot be installed under direction sunshine, or the internal temperature of the inverter will be excessively high and thus the inverter performance will be degraded for protecting the internal elements; or even the temperature protection will be activated by the excessively high temperature;
- ※ The inverter shall be installed in a clean environment that the environmental temperature is $-25^{\circ}\text{C} - +60^{\circ}\text{C}$;
- ※ The environmental relative humidity is not higher than 95% and without any condensation;
- ※ The inverter LCD shall be leveled with eyes and with enough space in the front for inspection;
- ※ For avoiding burning injury or electric shock, the inverter shall be installed beyond the touch distance of a child. The temperature of some parts (e.g.: the heat radiator) is quite high when the inverter is running;
- ※ Make sure the installation position will not shake;
- ※ The inverter shall be installed in a well ventilated place to ensure the normal heat radiation;
- ※ The installation place shall be firm enough to support the inverter weight for long;
- ※ The inverter shall be installed on a vertical wall, or within 15° at most if backwards to the wall.
- ※ Connecting terminals are located at the bottom.

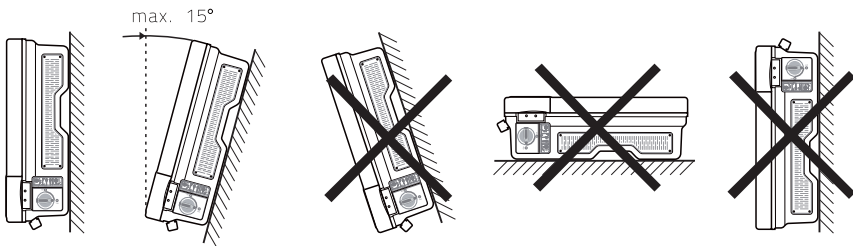


Fig. 3-4: Selecting a position for installation

Tab. 3-2: Effective spacing dimensions

Position	Min. size (cm)
Front	20mm
Lateral	40mm
Top	40mm
Bottom	50mm

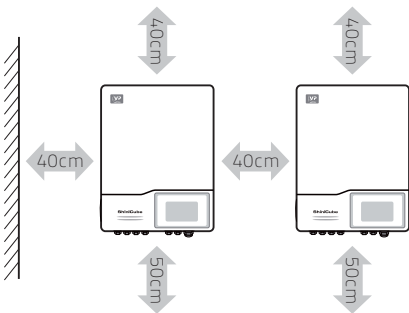


Fig. 3-5: Schematic drawing for the minimum spacing dimensions for inverter installation

3.5 Inverter installation

Take out the back board from the package, and then install the back board on the firm wall by expansion screws or on a metal support by bolts.

3.5.1 Installation on a wall

If the inverter is to be installed on a firm wall, please operate as per the following steps:

- 1) Take out the back board and mark the installation holes;
- 2) Drill holes in the marked position as per the size of expansion screws;
- 3) Insert the expansion tubes into the hole, knock the tubes into the hole and make them level with the wall surface;
- 4) Fix the back board to the wall by the tapping screws tightly;

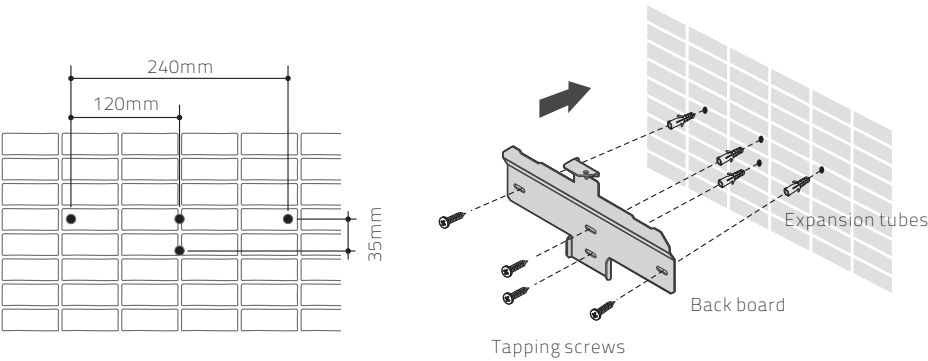


Fig. 3-6: Schematic drawing for back board installation (on a wall)

- 5) Carefully lift up the inverter and hang it on the back board slowly according to the notch and slot, and then visually check if the inverter is correctly installed;

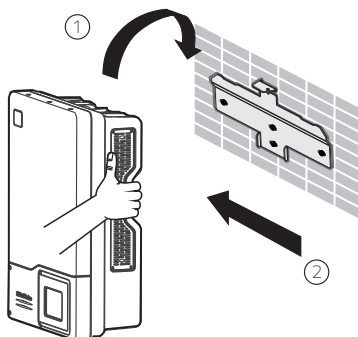


Fig. 3-7: Schematic drawing for inverter installation (on a wall)

- 6) After installation, you can choose if it is necessary to attach the inverter with an anti-theft lock.



Tip

The anti-theft lock is not in the scope of delivery, and you need to equip one by yourself. See 3.5.3 for the specification of the anti-theft lock.

3.5.2 Installation on a support

If the inverter is to be installed on a metal support, the support must be thick enough to bear the inverter weight:

- 1) Take out the back board and place the board on the metal support horizontally;
- 2) Mark the positions for drilling holes according to the back board specification;



Tip

If the hole position on the back board is not matched with the support, it is recommended to replace a support other than to drill new holes on the back board. Drilling new holes on the back board will unbalance the stress on the board, and Victory Power will take no responsibility for such unexpected situation if any.

- 3) In this installation mode, bolts M5*50 and corresponding nuts can be used for fixing the back board. These fasteners are not covered in the scope of deliver, and shall be equipped by the user of own cost. Drill holes at the marked position on the installation support as per the specification of the fasteners;



Tip

Bolts supplied by the user shall be M5*50 or longer bolts for thicker support. Bolts shall be selected in consideration of the support thickness.

4) Install the back board on the support by the fasteners;

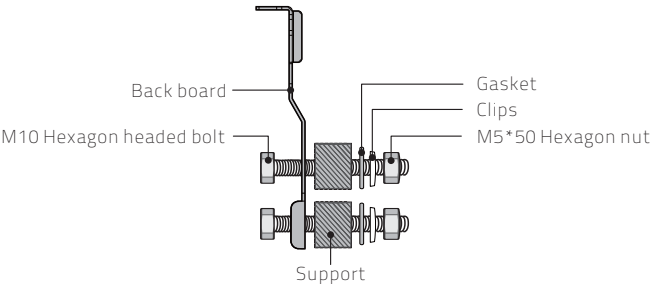


Fig. 3-8: Schematic drawing for back board installation (on a support)

5) Carefully lift up the inverter and hang it on the back board slowly according to the notch and slot, and then visually check if the inverter is correctly installed;

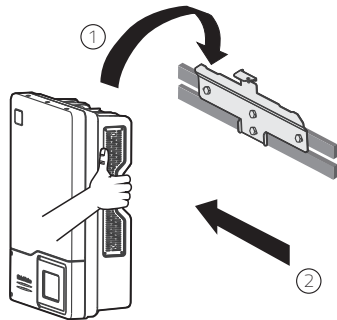


Fig. 3-9: Schematic drawing for inverter installation (on a support)

6) After installation, you can choose if it is necessary to attach the inverter with an anti-theft lock.

3.5.3 Optional anti-theft lock

An anti-theft lock can be used to lock the inverter on the back board and protect the outdoor installed inverter from theft.

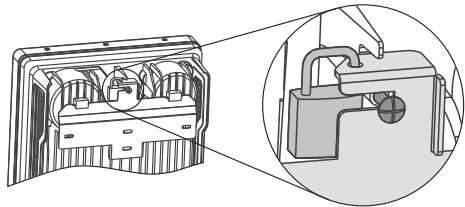


Fig. 3-10: Schematic drawing for an anti-theft lock

The lock size shall satisfy the following requirement:

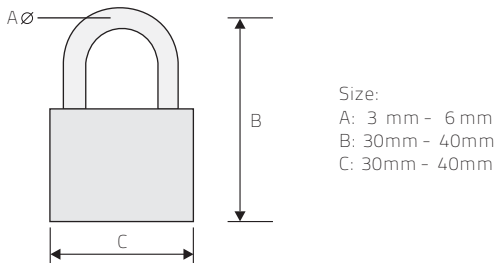


Fig. 3-10: Size of an anti-theft lock



Notice

- The anti-theft lock selected must be suitable for outdoor installation;
- Regularly check if the lock can be normally opened;
- The key to the anti-theft lock must be well kept.

3.6 Electrical connection

After the inverter is correctly installed on the wall or support, the next step is the electrical connection for the inverter. Electrical connection must be performed according to related safety standards.



Danger

A misoperation electrical connection may cause personal injury or death or damage the inverter irreversibly. Wiring operation must be performed by a qualified electrical engineer.



Warning

All electrical installation must be complying with local and national electrical standards.



Warning

The inverter cannot be connected to the grid unless approved by the local electrical authority and all electrical connections are completed by a qualified electrical engineer.



Warning

Please use cables of specification recommended by us, or the system safety may be degraded.

The electrical connection for an inverter covers electrical cable connection and communication cable connection.

3.6.1 Electric and electrical system structure

The electric and electrical connection for the whole solar energy power generation system is shown as below:

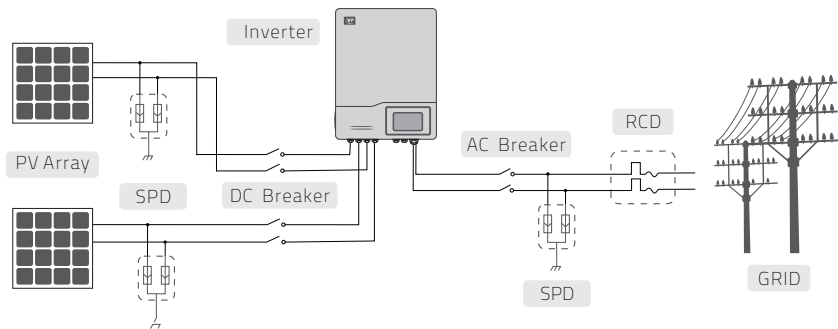


Fig. 3-12 Schematic drawing for the electrical cable connection of the inverter

The PV array is connected to the inverter via a DC breaker, the inverter is connected to the grid via an AC breaker and a residual current device (RCD), and surge protection device (SPD) are configured on the AC and DC sides respectively.

No load can be directly connected to the output side of the inverter.

3.6.2 Structure of the communication system

ShiniCube supports two flexible communication modes: RS485 and optional wireless Zigbee. The topological structure of the communication connection is introduced below.

**Tip**

See 3.6.3 for the detailed wiring terminals and 3.6.4 for the detailed wiring steps.

- Communication between a single device and a PC

1) Single device communication mode 1 (RS485)

See the figure below for the connecting method, a pair of A/B terminals on the inverter is connected to the A/B terminals on the RS485/RS232 or RS485/USB switch, and the other end of the switch is connected to the computer.



Fig. 3-13: Schematic drawing for the single device communication mode 1

2) Single device communication mode 2 (wireless Zigbee module)

The connecting method is shown below, and a pair of wireless Zigbee modules is installed on the inverter and computer.



Fig. 3-14: Schematic drawing for the single device communication mode 2

• Communication between multiple devices and a PC

1) Multi-device communication mode 1 (RS485)

See the figure below for the connecting method, A/B terminals on the inverter are paralleled and then connected to the A/B terminals on the RS485/RS232 or RS485/USB switch, and the other end of the switch is connected to the computer. 32 inverters can be connected by this mode.



Fig. 3-15: Schematic drawing for the multi-device communication mode 1



Tip

The "Multi-device communication mode 1" with RS485 is applicable for centralized installation where wiring is convenient between the computer and devices.

2) Multi-device communication mode 2 (RS485 and Zigbee module)

See the figure below for the connecting method, A/B terminals of inverters are paralleled, and a pair of Zigbee module is installed on any one of the inverters and the PC. 32 inverters can be connected by this mode.



Fig. 3-16: Schematic drawing for the multi-device communication mode 2



Tip

The "Multi-device communication mode 2" with RS485 and Zigbee is applicable for centralized installation where wiring is not convenient between the computer and devices. This communication mode is recommended.

3) Multi-device communication mode 3 (Zigbee module)

The connecting method is shown below, each inverter and the PC is installed with a Zigbee module. 100 inverters can be connected by this mode.



Fig. 3-17: Schematic drawing for the multi-device communication mode 3



Tip

The "Multi-device communication mode 3" with Zigbee modules are applicable for decentralized installation in which wiring is not convenient.



Tip

If RS485 communication mode is selected, it is recommended to use two-core dual-twisted shield cable. The recommended specification is RVVP2*1.0. The maximum transmission distance of RS485 communication mode is 1200m.



Tip

RS485/RS232 switch module, RS232/USB switch module and Zigbee wireless module are serial products orderable from Victory Power RS485/RS232 switch module and RS232/USB switch module can be purchased by the user of own.



Notice

Zigbee wireless communication is functioning within 1200m in an opening distance, but interference and barrier shall be put into consideration because the actual transmission distance is influenced by the installation field and external interference.

3.6.3 Wiring terminals and cable specification

1) DC wiring terminals

The DC side has 4 terminals totally, two pairs of positives and negatives. See the figure below:

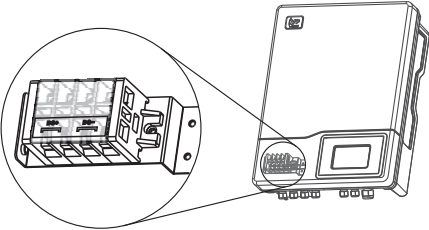


Fig. 3-18: DC wiring terminals

2) AC wiring terminals

The AC side has three terminals: L, N and GND, in which, GND is located on the shell, shown in the figure below:

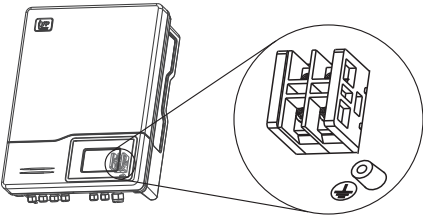


Fig. 3-19: AC wiring terminals

3)Communication terminals

The inverter has six communication terminals: two pairs of A/B, +5V and GND. See the figure below:

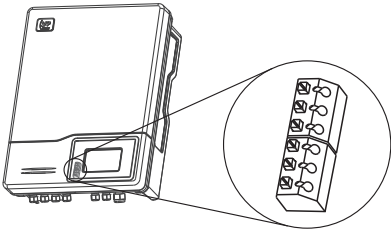


Fig. 3-120: Communication terminals

Tab. 3-3: Meaning of communication terminals

Terminal SN	Terminal name	Corresponding cable
L1	B ₁	RS485 communication cable B or Zigbee module communication cable B (blue)
L2	A ₁	RS485 communication cable A or Zigbee module communication cable A (green)
L3	B ₂	RS485 communication cable B or Zigbee module communication cable B (blue)
L4	A ₂	RS485 communication cable A or Zigbee module communication cable A (green)
L5	+5V	Zigbee module power supply cable +5V (red)
L6	GND	Zigbee module power supply cable GND (black)



Tip The Zigbee wireless communication module at the inverter side has a cable with 4 wires inside (blue, green, red and black) corresponding to the wiring terminals B, A, +5V and GND, in which, the inverter wiring terminals have two pairs of A/B, and each pair can be connected.



Tip The two pairs of A/B wiring terminals at the inverter communication side are equivalent. A/B of Zigbee module and A/B of RS485 can be connected with no difference.

- Single-device communication: either pair of A/B terminals can be connected if Zigbee module or RS485 module is connected.
- Multi-device communication: either pair of the A/B terminals can be connected to the Zigbee module and the other pair to RS485 if Zigbee module and RS485 are both connected.
- Multi-device communication: two routes of RS485 can be connected, and either pair of A/B terminals can be used as the input and the other pair as the output.

4) Cables of the following specification will be equipped by the user of own cost.

Tab. 3-4: Recommended cable specification

Name	Min. sectional area (mm ²)	Max. sectional area (mm ²)	Recommended sectional area (mm ²)
DC cable (+)	2	4	4
DC cable (-)	2	4	4
AC cable (L)	4	6	4
AC cable (N)	4	6	4
AC cable (GND)	4	6	4
Communication cable (RS485)	0.5	1.5	1

3.6.4 Steps for electrical connection



Danger

Please cover the photovoltaic battery board by lightproof material or cut off the DC circuit breaker before electrical connection. A dangerous voltage will be generated by the photovoltaic matrix exposed in the sunshine.



Danger

If the inverter has been electrified and tested before connection, wiring cannot be performed unless the AC and DC power supplies are cut off for 10min and a multimeter shows that the DC side is totally discharged.



Caution

When designing the PV array, make sure the maximum open circuit voltage is not higher than 550V at each series of PV group. Otherwise the inverter will be damaged irreversibly.



Tip

Different colors of cables shall be used for differentiating in assembling. E.g.: the positive pole is connected by a red cable and the negative by a blue cable.



Tip

To balance each PV series, cables shall be with the same sectional area.



Tip

DC cable between the inverter and the assembly shall be the special PV cable. The voltage drop from the terminal box to the inverter is about 1-2%. It is recommended the inverter is installed on the assembly support for generation to reduce the cable cost and DC loss.



Tip

High performance and high quality PV assemblies shall be used. The open circuit voltage in the serial array must be lower than the maximum DC input voltage in the PV grid-tied inverter, and the working voltage of the serial array must comply with the MPPT voltage in the PV grid-tied inverter.



Notice

- Protect the LCD panel during wiring;
- Protect the LCD panel and other elements from scratch or damage by cables or tools.

3.6.4.1 Steps for DC connection

- 1) Make sure the maximum open circuit voltage of the PV series is not higher than 550V, and check the polarity of the PV series;
- 2) Cut off the DC breaker, or cover the PV assembly by lightproof material to ensure the personal safety of wiring operator;
- 3) Check by a multimeter to make sure the DC cable is fully discharged;
- 4) Remove the 4 screws at the left of the inverter bottom cover by Allen wrench, and open the bottom cover rightwards;

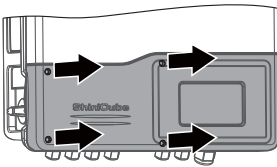


Fig. 3-21: Remove the screws from the bottom cover

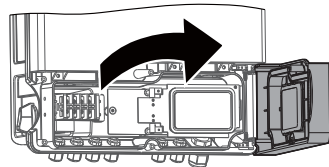


Fig. 3-22: Open the bottom cover rightwards

- 5) Check by a multimeter to make sure the DC wiring terminal is fully discharged;
- 6) Remove the waterproof cover from the DC input terminal, lead the cable through the cover and then to the device via the waterproof terminal;

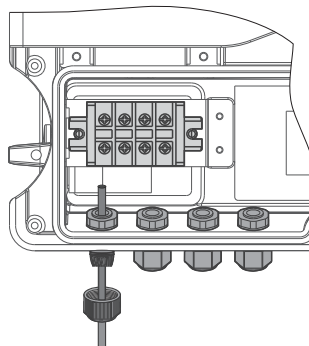


Fig. 3-23: Lead the DC cable to the device

7) Estimate the cable length, peel off the cable as per the length of the wiring part of the OT cold pressed terminal, and press on the OT cold pressed terminal by a pair of press pinchers;

**Tip**

To facilitate wiring operation and device maintenance, the estimated cable length shall be 10cm longer than the actual cable length to the terminal.

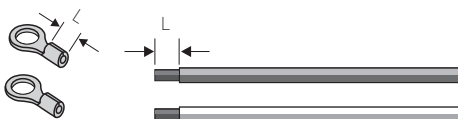


Fig. 3-24: Peel off the cable as per the length of wiring terminal

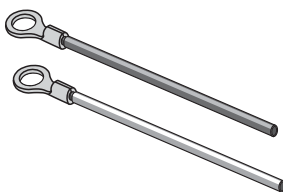


Fig. 3-25: Press on the wiring terminal firmly

8) Connect the cable to the wiring terminal by a screw driver reliably;

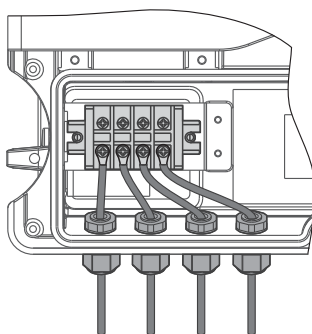


Fig. 3-26: Connect the DC cable reliably

9) Tighten the waterproof DC input terminal cover;

10) Connect all DC cables reliably as per the steps above.

3.6.4.2 Steps for AC connection

- 1) Cut off the AC breaker, check by a multimeter and make sure the AC cable is fully discharged;
- 2) Remove the screws from the top right of the LCD panel, and open the panel leftwards to disclose the AC and communication terminals;

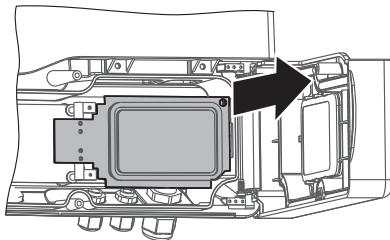


Fig. 3-27: Remove the screws from LCD panel

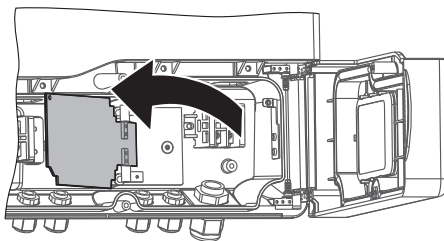


Fig. 3-28: Open the LCD panel leftwards

- 3) Remove the waterproof cover from the AC input terminal, lead the cable through the cover and then to the device via the waterproof terminal;

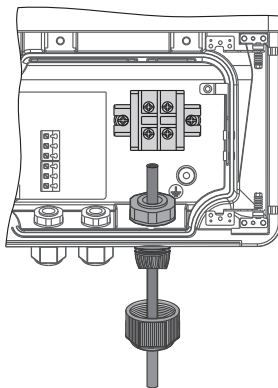


Fig. 3-29: Lead the AC cable to the device

4) Estimate the cable length, peel off the cable as per the length of the wiring part of the OT cold pressed terminal, and press on the OT cold pressed terminal by a pair of press pinchers;



Tip

To facilitate wiring operation and device maintenance, the estimated cable length shall be 10cm longer than the actual cable length to the terminal.

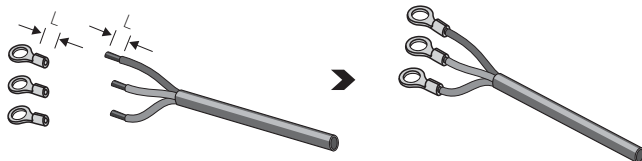


Fig. 3-30: Press on the wiring terminal firmly

5) Connect the cables respectively to terminals L, N and GND by a screw driver, in which, GND is located on the shell of the inverter;

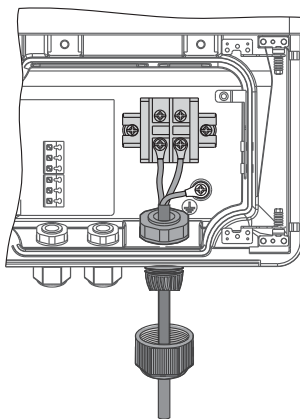


Fig. 3-31: Connect the AC cable reliably

6) Tighten the waterproof AC terminal cover.

7) This step can be jumped over if the communication cable is to be connected. Check if the AC and DC cables are reliably connected, record the cable colors and corresponding functions, close the LCD panel and the bottom cover of the inverter if it is unnecessary to connect the communication cable. Jump over the following part and turn to "3.6.5 Requirement for earthing".

3.6.4.3 Connect RS485 as per the following steps.

- 1) Remove the waterproof cover from the RS485 terminal, lead the cable through the cover and then to the device via the waterproof terminal;
- 2) Estimate the cable length to the terminal, peel off the cable as per the length of the metal section of the tube type pre-insulated terminal, and press on the terminal by a pair of press pinchers reliably;



Fig. 3-32: Press on the RS485 wiring terminal

- 3) Press down the top of the terminal by a flat screw driver, insert the tube type pre-insulated terminal into the corresponding inverter terminal, and then loosen the screw driver. Firmly connect the cable to the device terminals A/B respectively, and record the corresponding cable colors;

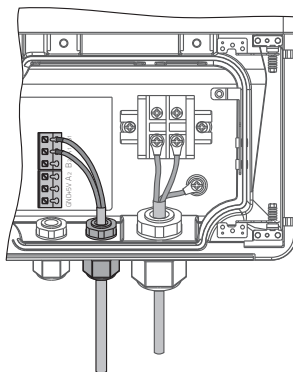


Fig. 3-33: RS485 reliable connection

- 4) Tighten the waterproof RS485 terminal cover.

3.6.4.4 Connect Zigbee wireless module as per the following steps.

- 1) Zigbee wireless communication module has a cable with four wires inside: blue, green, red and black corresponding to terminal B, A, +5V and GND correspondingly.
- 2) Remove the waterproof cover from the Zigbee terminal, lead the cable through the cover and then to the device via the waterproof terminal;
- 3) Estimate the cable length to the terminal, peel off the cable as per the length of the metal section of the tube type pre-insulated terminal, and press on the terminal by a pair of press pinchers reliably;

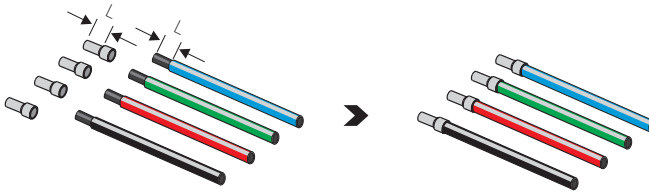


Fig. 3-34: Press on the Zigbee wiring terminal

- 4) Press down the top of the terminal by a flat screw driver, insert the tube type pre-insulated terminal into the corresponding inverter terminal, and then loosen the screw driver. Firmly connect the blue, green, red and black wires correspondingly to terminals B, A, +5V and GND;

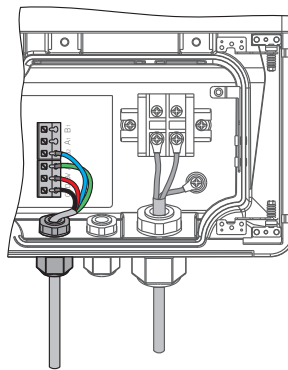


Fig. 3-35: Zigbee module reliable connection

- 5) Tighten the waterproof Zigbee terminal cover.
- 6) After all cables are connected, check if the AC and DC cables are reliably connected, record the cable colors and corresponding functions, close the LCD panel and the bottom cover of the inverter.

3.6.5 Earthing requirement

**Caution**

The inverter is a device with no transformer, neither the positive nor the negative pole of the PV assembly DC side can be earthed, or the inverter will not work normally, or even be damaged irreversibly.

In ShiniCube PV power generation system, all device shells, assembly supports and the GND terminal of the inverter must be safely and reliably earthed.

4 Trial operation

4.1 Check before operation

**Warning**

Necessary safety check must be performed before the inverter is electrified for trial operation !

4.1.1 Check for reliability of mechanical installation

Check if the inverter is firmly installed and if all bolts are reliably tightened. For an inverter installed on a metal support, make sure each bolt is tightened and the support has enough load bearing capacity.

4.1.2 Check for connecting cables

Check if all cables in the system are firmly connected without any missed or wrong connection, and especially check if all positive and negative poles are correct. If a DC switch is equipped on the inverter, the DC switch shall be turn to the "OFF" state.

4.1.3 Electrical check

Make sure the DC input voltage of the inverter is lower than 550V (with the temperature decrease of the PV assembly, the open circuit voltage will be increased, so a residual voltage at the low temperature must be put into consideration).

Make sure the grid parameters are complying with the inverter parameters.

4.2 Electrify the inverter

The inverter can be started up as per the following steps after all testing and checking steps are performed.

Close the DC breaker, and turn the DC switch to the "ON" state if a DC switch is equipped on the inverter.

Close the AC breaker;

See Part 5 of this manual for "Human-machine interaction" after the inverter is started up. If enough power energy can be generated in the solar array, the inverter will be started up automatically, and LCD will display the normal state which means the inverter is successfully started up. If the inverter is not normally started up, please refer to Part 6 "Troubleshooting and maintenance".

5 Human-machine interaction

5.1 LCD interface

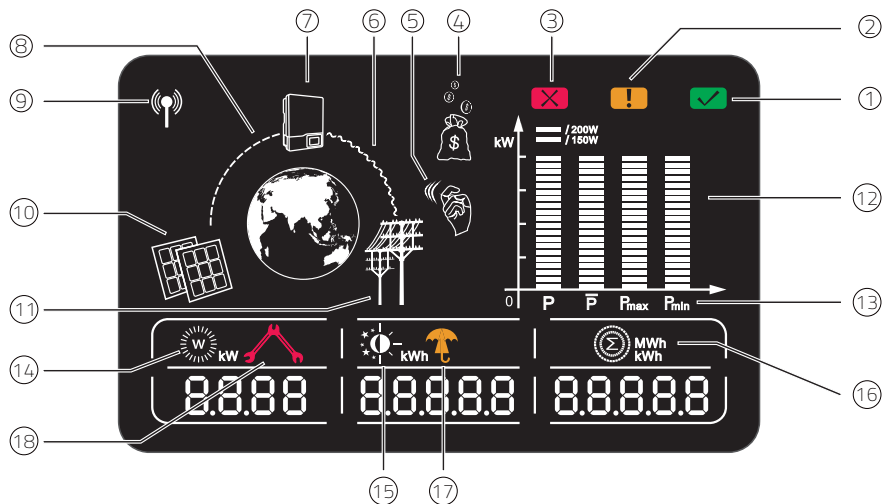


Fig. 5-1: LCD displaying panel

Tab. 5-1: Introduction to symbols on the LCD panel

SN	Symbol	Description
①		It means the inverter is running normally (sleeping, standing-by and power generating states)
②		The inverter enters the protection state.
③		The inverter enters the fault state.
④		The PV system is running normally, and the "coin" symbol means the system is generating power.
⑤		It dynamically means the LCD is in the power saving state, and the LCD will turn to the normal displaying mode if knocking the inverter shell by a finger lightly.
⑥		The twinkling speed means the voltage intensity at the AC side
⑦		The "normally on" state means the inverter is running normally. The "twinkling" state means the inverter is in the fault state.
⑧		The twinkling speed means the voltage intensity at the DC side

SN	Symbol	Description
⑨		It means the communication state of the inverter.
⑩		The dynamic state means there is fault in the DC side, the static state means there is voltage at the DC side.
⑪		The dynamic state means there is fault in the AC side, the static state means there is voltage at the AC side.
⑫		When the system is running normally, powers are displayed by a column chart, and the minimum unit is 150W or 200W (as per the actual value displayed).
⑬	$\begin{matrix} P & / & \bar{P} \\ P_{\max} & / & P_{\min} \end{matrix}$	P : current power; $\bar{P}$: mean power; $P_{\max}$: maximum power; $P_{\min}$: minimum power
⑭	 kW	It indicates the current power, unit: KW; when displaying dynamically, the value below indicates the real-time power.
⑮	 kWh	It indicates the electric quantity of the current day, unit: KWh, and the value below means the electric quantity of the current day.
⑯	 MWh kWh	It indicates the total electric quantity, unit: KWh or MWh (as per the actual value displayed), and the value below means the total electric quantity.
⑰		It means the system enters the "protection state", this symbol is displayed dynamically, and the value below means the protection code (see Part 6 of this manual for details).
⑱		It means the system enters the "fault state", this symbol is displayed dynamically, and the value below means the fault code (see Part 6 of this manual for details).

5.2 Internal data storage

This device has the calendar and data storage function, and detailed data storage for 200 days can be realized without any external data collector.

1) History data storage

Data will be stored once per minute, the data stored include the total power generated, I/O power, I/O current, I/O voltage and power factor at the storing time point.

2) Running state record

It can save the running state of the device, including the starting time point and ending time point of the running state, so that the user can check the running state conveniently.

3) Device fault/ protection event record

It stores the type and time point of any fault or protection event.

5.3 Introduction to the function of monitor software

ShiniCube inverter can realize data reviewing and parameter setting, etc by the monitor software, the following is a brief introduction to the monitor software, and for more details please read the instruction manual for the monitor software.

**Tip**

You can download the most updated monitor software and the corresponding user's manual on our website :
www.victorypower.com.

5.3.1 Main interface

- 1) Device list zone: names of all registered devices with the communication state (LIVE or OFF) are displayed by a module tree, and one of the device can be selected as the current device by clicking.
- 2) Accumulated data displaying zone: the total electric quantity, current day power generated, total power generating time and the current running state of each device in the device list are displayed by a data table.
- 3) Current device real-time data zone: the real-time data of the current data including the I/O power, I/O current, I/O voltage, power factor and efficiency of the current device are displayed by a data table.
- 4) Current device current day data curve: the data curve of the current device including the current day power generated, input power and output power are displayed by curves.

5.3.2 Device management

- 1) Device registration: a new device can be added into the device list by the user;
- 2) Device modification: the name of a registered device can be modified by the user;
- 3) Device deletion: a dismantled device can be deleted from the device list by the user;

5.3.3 Data review

1) History data curve

The history data curve for each device of any day during the storage period can be reviewed, and the data include the generated electric quantity, I/O power, I/O current and I/O voltage of the day reviewed.

2) History generated electric quantity

The generated electric quantity during a section of storage period for each device in the device list can be reviewed, including the total quantity, weekly quantity, monthly quantity and yearly quantity.

- 3) The system information of each device in the device list can be reviewed, including the running state information and fault/ protection information of the device.

5.3.4 Parameter setting

- 1) Serial port setting: select the serial port number for device communication;
- 2) Device selecting: select the device to be set;
- 3) Time setting: set the time of the current device;
- 4) Safety standard review: review the safety standard for the current device;
- 5) Safety standard setting: set the safety standard for the current device, and this function needs to be verified by a password.



Warning

The safety standard for the inverter cannot be modified of own accord, the modified standard shall comply with the local grid standard, and the safety standard setting must be performed by a qualified electrical engineer who is familiar with ShiniCube inverter and the local power grid. A wrong safety standard setting may cause some damage of device or cancellation of grid connecting license, and in this case Victory Power will take no consequential responsibility.

5.4 Inverter working mode

After the inverter is started up, the normal working state will be switched as per the chart below:

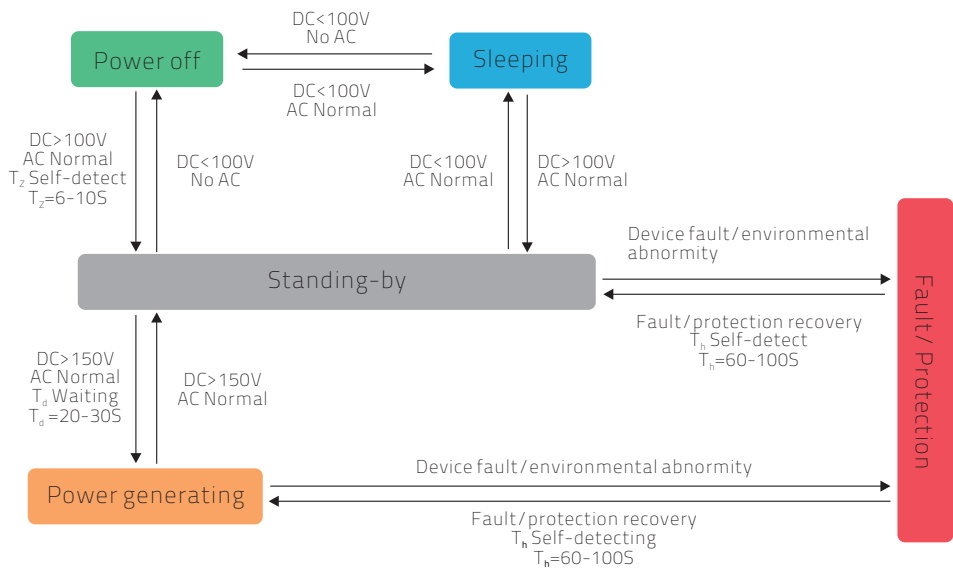


Fig. 5-2: Schematic chart for the switch of working mode

See the following content for the meaning of each state.

5.4.1 Standing-by state

When the DC voltage output from the solar battery at the DC side is higher than 100V (min. initiating voltage) but lower than 150V (min working voltage), the inverter will enter the standing-by state and not supply power to the grid. In this case, the inverter will keep monitoring the voltage on the solar batter board, and will enter the power generating state once it reaches the working voltage 150V.

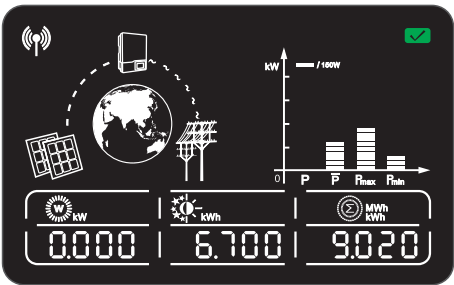


Fig. 5-3: LCD panel at the standing-by state

5.4.2 Power generating state

The inverter will enter the power generating state if the DC voltage output from the solar battery board at the DC side is higher than 150V.

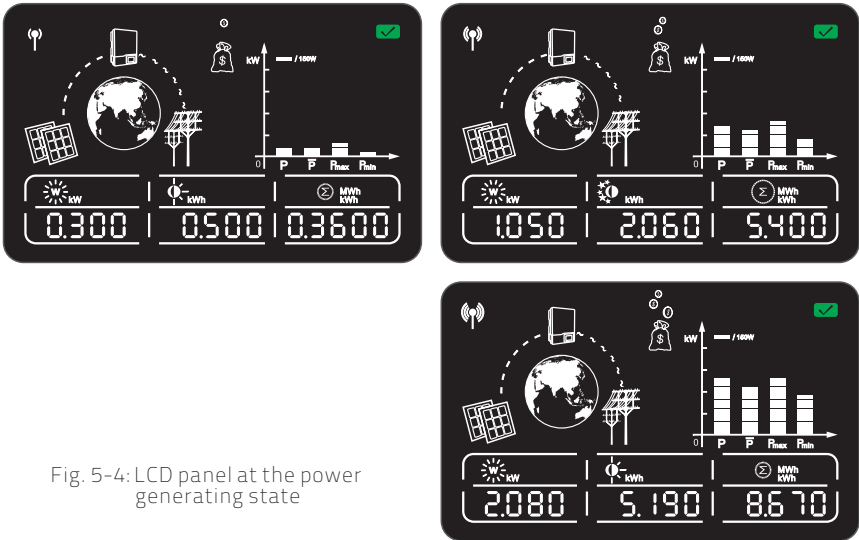


Fig. 5-4: LCD panel at the power generating state

See the following content for the meaning of each state.

5.4.3 Protection state

If any external fault such as AC side grid fault is detected by the inverter, the inverter will stop power generating and enter the protection state, in this case the yellow indicator on the right top of the LCP panel will turn on and display the corresponding protection code. Troubleshooting can be performed by the user according to this code. The inverter will keep monitoring if the external fault is removed, and will keep in the protection state unless the fault is removed. It will be reenter the grid-connect power generating mode if the fault is removed.

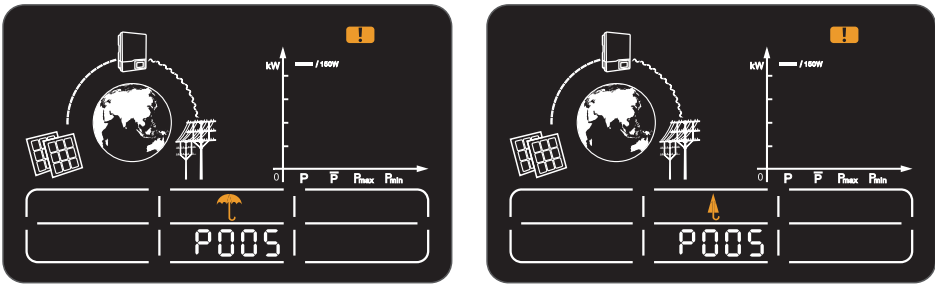


Fig. 5-5: LCD panel at the protection state

5.4.4 Fault state

If any internal fault is detected by the inverter, the inverter will stop power generating and enter the fault state, in this case the red indicator on the left top of the LCP panel will turn on and display the corresponding protection code. Troubleshooting can be performed by the user according to this code. The inverter will keep monitoring if the internal fault is removed, and will keep in the protection state unless the fault is removed. It will be reenter the grid-connect power generating mode if the fault is removed.

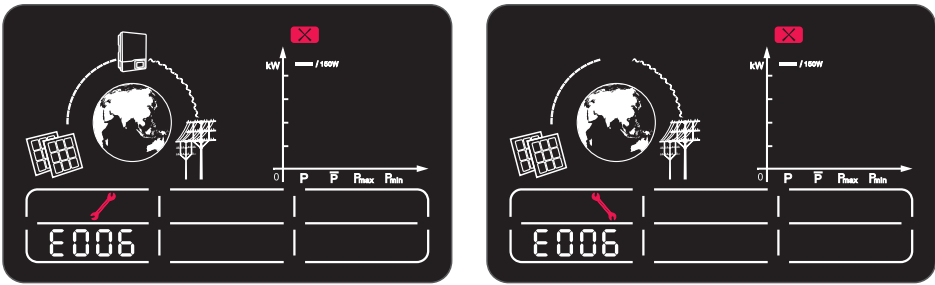


Fig. 5-6: LCD panel at the fault state

When the inverter enters the protection or fault state, and there are two or more protection or fault codes at the same time, in this case it means the system or inverter may be involved with two or more faults. The code below the protection or fault symbol will change alternatively in different protection or fault states.

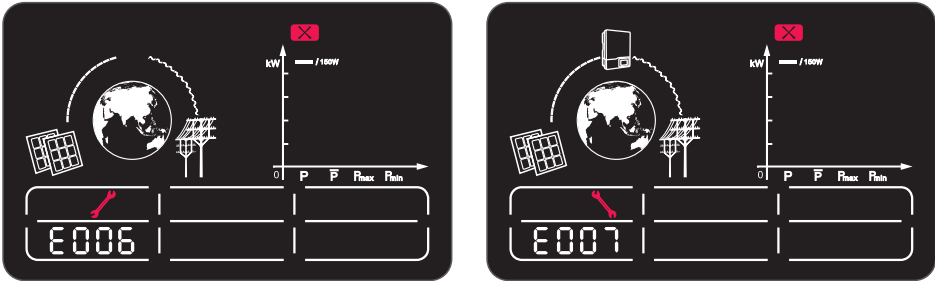


Fig. 5-7: LCD panel displaying two faults alternatively at the same time

5.4.5 Sleeping state

If the DC voltage output from the solar battery at the DC side is lower than 100V (minimum initiating voltage) and there is voltage at the grid side, the inverter will enter the sleeping mode and the LCD panel will display nothing. In this case the related data can be reviewed if knocking the inverter shell by a finger slightly.

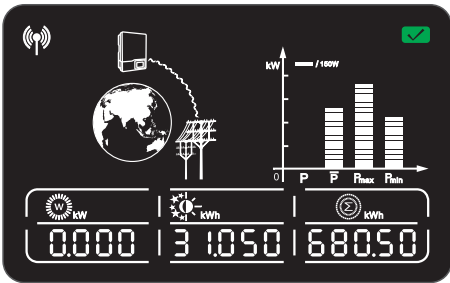


Fig. 5-8: Reviewable LCD panel at the sleeping state

5.4.6 Power-off state

If the DC voltage output from the solar battery at the DC side is lower than 100V (minimum initiating voltage) and there is no voltage at the grid side, the inverter will enter the power-off mode and the LCD panel will display nothing.

5.5 LCD panel power saving mode



Tip

If the inverter is running but is not operated for a long time, the LCD panel will automatically enter the power saving mode after about 2min, and in this case the related data can be reviewed by the user if knocking the inverter shell by a finger slightly.

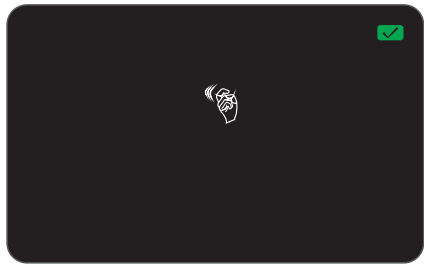


Fig. 5-9: LCD panel power saving mode

6 Troubleshooting and maintenance

6.1 Troubleshooting

This part introduces the common faults and solving steps, provides troubleshooting method and skills to the user, and helps the user identify and solve some common fault of the inverter.

**Tip**

Faults mentioned in this part means the inverter enters the protection state or fault state.

The protection state is mostly caused by some external reasons, e.g.: the DC voltage is too high, the inverter output is not matched with the grid, the grid is power off or the system is not correctly earthed, and thus the inverter acts to ensure the own safety. The inverter itself has no defect and can be recovered from the protection state if the system is correctly designed and installed.

Sometimes the inverter enters the protection state by the own defect and can be recovered by resetting or repairing.

The fault state is caused by the own defect of the inverter, and thus the inverter acts to protect the system safety. The inverter can be recovered from some faults automatically or by resetting, and some faults are caused by the own defect of the inverter, and in this case the inverter cannot be recovered and shall be repaired.

Correctly identifying the fault state of the inverter is helpful for solving the fault, so please treat as per the following steps:

- 1) Check if the state displayed on the panel is a protection state or fault state, and record all error codes;
- 2) Try the solution listed in Tab. 6-1 and 6-2 and meanwhile check as per the following steps;
 - If the voltage at the AC/DC side is normal and if the breaker is opened?
 - If the inverter is installed in a clean, dry and well ventilated place?
 - If the cable sectional area satisfies the requirement?
 - If the connecting cable is too long?
 - If all cables are firmly connected?
 - If wiring is reasonable?
 - If the safety standard setting is correct?
- 3) If you meet any problem that you cannot solve it by yourself, please contact the client service man of Victory Power For the optimal solution, please provide use the detailed system installation information, inverter model, serial number and fault information.

Tab. 6-1: Protection code and solution

Displayed code	Protection description	Recommended solution
P001	The leakage current is too high	1.Cut off the DC breaker and check if there is abnormality in the AC side; 2.After the fault is removed, close the DC breaker and restart the inverter; 3.If the fault occurs repeatedly, please ask for professional service.
P002	The voltage at the grid side is too high	1.Check if the inverter is normally connected to the grid; 2.Check if the grid voltage and frequency are complying with the output scope of the inverter; 3.If the fault above is removed but the inverter can still not work normally, please ask for professional service.
P003	The voltage at the grid side is too low	
P004	The frequency at the grid side is too high	
P005	The frequency at the grid side is too low	
P006	Islanding protection	
P007	The insulating impedance is too low	1.Cut off the DC breaker; 2.Check if the resistance between the +/- poles of the PV assembly and the ground is larger than $1M\Omega$; 3.If the fault above is removed but the inverter can still not work normally, please ask for professional service.
P013	The DC current input is too high	1.Cut off the DC breaker; 2.Check if DC input is higher than 550V; 3.If the fault above is removed but the inverter can still not work normally, please ask for professional service.
P014	The DC voltage is too high	

Tab. 6-2: Fault code and solution

Displayed code	Fault description	Recommended solution
E001	Relay fault	1.Cut off the DC breaker; 2.Wait for several seconds till the LCD panel turns off, and then close the DC breaker and restart the inverter; 3.If the above operation is made but the inverter can still not work normally, please ask for professional service.
E002	The voltage at the grid side is too high	
E003	Abnornity of CPU synchronous communication	
E004	E ² ROM read-write abnornity	
E006	Leakage current detecting circuit fault	
E009	The AC voltage output is too high	
E010	The DC voltage branched from the AC voltage output is too high	
E011	The BUS voltage is too high	
E012	The BUS voltage is too low	
E013	The IGBT temperature is too high	
E014	BOOST fault	
E015	Inverting fault	
E017	The BUS capacity is aged	1.These faults arise from normal aging of device elements or damage of consumables, and the inverter can still generate power normally; 2. If such faults are found, please replace the corresponding element, and contact the professional service man.
E022	The voltage dependent resistor at the output side is broken	
E023	The voltage dependent resistor at the input side is broken	
E024	FLASH read-write abnornity	

6.2 Daily maintenance

It is unnecessary to maintain the inverter in normal conditions but it is necessary to make sure the inverter is not covered by dust.

➤ Cleaning

The inverter can be cleaned by electric compressed air blower, dry soft cloth or soft brush. Please never clean the inverter by any water, corrosive chemical agent or cleaning agent.

➤ Heat radiation

To protect the normal operation and prolong the service life of the inverter, the inverter must be installed in a well ventilated space without any air barrier surrounding the heat radiator at the back of the inverter, and dust or snow must be removed timely if any.

7 Uninstallation

The inverter shall be treated as per the following steps if it is to be replaced or out of service.

7.1 Uninstalling steps

- 1) Cut off the AC breaker;
- 2) Cut off the DC breaker;
- 3) Wait for 10min till the inverter is fully discharged;
- 4) Check by a multimeter and make sure neither the AC side nor the DC side is electrified;
- 5) Remove the 4 screws from the left bottom of the inverter and open the bottom cover rightwards;
- 6) Remove the DC cable by a screw driver;
- 7) Remove the waterproof DC terminal cover and cut off the OT cold pressed DC terminal by a pair of cutting pliers, and take out the cable;
- 8) Remove the screws from the top right of the inverter LCD display, and open the panel leftwards;
- 9) Remove the communication cable and AC cable by a screw driver;
- 10) Remove the waterproof AC terminal cover and cut off the OT cold pressed AC terminal by a pair of cutting pliers, and take out the cable;
- 11) Close the inverter panel and bottom cover;
- 12) Remove the inverter from the back board and further remove the back board if necessary.

7.2 Packing

Please pack the inverter with the original package if possible. If the original package is not available, please pack with a carton satisfying the following requirement.

- Firm enough for 45kg;
- Easy for handling;
- Fully closeable.

7.3 Storing

The inverter must be stored in a dry and clean place of -25°C - $+80^{\circ}\text{C}$.

7.4 Solution at the termination of service period

At the termination of inverter service period, please send the inverter and package material to the designated place for electronic waste treatment. Contact the related authority for treating and recovering if necessary. No inverter or any part can be disposed or own accord.

8 Technical parameters

Tab. 8-1: Technical parameters

Model name	ShiniCube1600TL	ShiniCube2200TL	ShiniCube2800TL	ShiniCube3300TL
DC side/Input parameters				
Max. DC power[W]	1800	2400	3000	3500
Max. DC voltage [Vdc]	550	550	550	550
Min. System start/ Feed in voltage[Vdc]	100/150	100/150	100/150	100/150
MPPT voltage range [Vdc]	175-480	175-480	175-500	175-500
Max. input current [A]	9	13	17	18
Number of MPP trackers	1	1	1	1
Max. number of strings (parallel)	2	2	2	2
AC side/output parameters				
Nominal output power [W]	1600	2150	2650	3000
Maximum output power [W]	1600	2200	2800	3300
Nominal output voltage/range [V]	208,220,230,240/180-265			
AC grid frequency/ range[Hz]	50,60/±4.5, auto-selection			
Maximum output current[A]	9	12	15	18
AC connection(with PE)	Single phase	Single phase	Single phase	Single phase
Current distortion (THDi) [%]	<3	<3	<3	<3
Power Factor[%]	>99.95	>99.95	>99.95	>99.95
Efficiency				
Maximum conversion efficiency[%]	96.7	96.7	96.9	96.9
European Efficiency[%]	96.1	96.1	96.2	96.4
MPPT efficiency[%]	99.99	99.99	99.99	99.99
Protection				
DC reverse-polarity protection/Short circuit protection/Ground fault/ residential current monitoring/Grid monitoring/DC/AC side varistors(thermally protected)				
Grid monitoring				

According to UL/VDE0126/G83/AS4777/DK5940/RD1663,etc

Tab. 8-2: General parameters

Model name	ShiniCube1600TL	ShiniCube2200T	ShiniCube2800TL	ShiniCube3300TL
Embedded DC Switch	Optional			
Night Mode support	Optional			
Night power consumption[W]	< 0.2			
Isolation type	Transformerless			
Protection degree	IP65			
Operation temperature[℃]	-25-60			
Heat Dissipation	Convection			
Acoustic noise level[dB]	<40			
Altitude[m]	<2000 without power derating			
Storage temperature[℃]	-30-80			
Real Time Clock module	yes			
LCD Display	Graphic and digital segment			
Communication Interface	Standard RS485(2 in parallel),Optional Zigbee wireless module			
Dimension (L/W/H)[mm]	480/370/162			
Weight[kg]	20			
Warranty				
Standard Warranty:5year/ Warranty Extension:10/15/20year（Optional）				

9 Quality assurance

9.1 Quality assurance

WuXi Victory Power New Energy Technology Co., Ltd. promises to provide ShiniCube inverter with a period of guaranteed repair for 5 years. The period of guaranteed repair starts from the installing day but is not more than 66 months after the inverter is delivered from Victory Power.

For an inverter with prolonged guarantee, the guarantee period refers to the clauses for the prolonged guarantee purchased.

We will provide maintenance or replacement service within the guarantee period for any own fault of the inverter. Please contact the professional distributor or installer or directly contact Victory Power if the inverter gets any malfunction or failure during the guarantee period.

9.2 Rights

For any product in the guarantee period, Victory Power will have right to ask the client to provide the invoice for buying the device, and the trademark on the device must be clear, or Victory Power will have right to provide no quality assurance;

The replaced inverter or any replaced part will be taken away by Victory Power;

The client shall arrange a reasonable time for us to provide service.

9.3 Exception clause

The following situations are not covered in the guaranteed repair:

- The inverter is used for any undersigned purpose;
- The system is not correctly designed;
- The inverter is not correctly installed or the installation is not complying with the standard;
- Any other unacceptable device is used in the system;
- Operating is incorrect;
- Any unauthorized modification or repair is made to the inverter;
- The inverter is damaged by any force majeure (electric shock, fire accident, earthquake or seaquake, etc);
- Operating beyond safety regulations;
- Damage in transportation.

9.4 Warranty card

Tab. 9-1: Warranty card

Warranty Card

Customer Information

Name:	
Address:	
Zip Code:	E-mail:
Tel:	Fax:

Installation Information

PV module type (parameters):	
Number of Strings:	Modules Per String:
System Commissioning Date:	Installation site:
Installation Company:	Installer Name:

Inverter detailed information

Fault Time:	Model of Products:
Number of used Products:	Number of Fault Products:
Date of Bill of Lading:	
Series No. of Fault Products:	
Fault Messages:	
Brief Fault Description and Photos(Can be attached):	

Customer Signature:	Date:
---------------------	-------

For the information on our warranty terms and conditions, please see our website: <http://www.victorypower.com>.

10 Contact Victory Power

10.1 About Victory Power

WuXi Victory Power New Energy Technology Co., Ltd. is specialized in the research, development, manufacture and distribution of inverter core techniques, new energy related software and hardware products of solar energy photovoltaic power generation primarily and wind power generation secondarily.

10.2 Contact Victory Power

Please keep the following contact ways by which you can consult with us for any product problem.

Add.: 1st Floor Area D, LI YE LOU, T-park, Wuxi New District, China

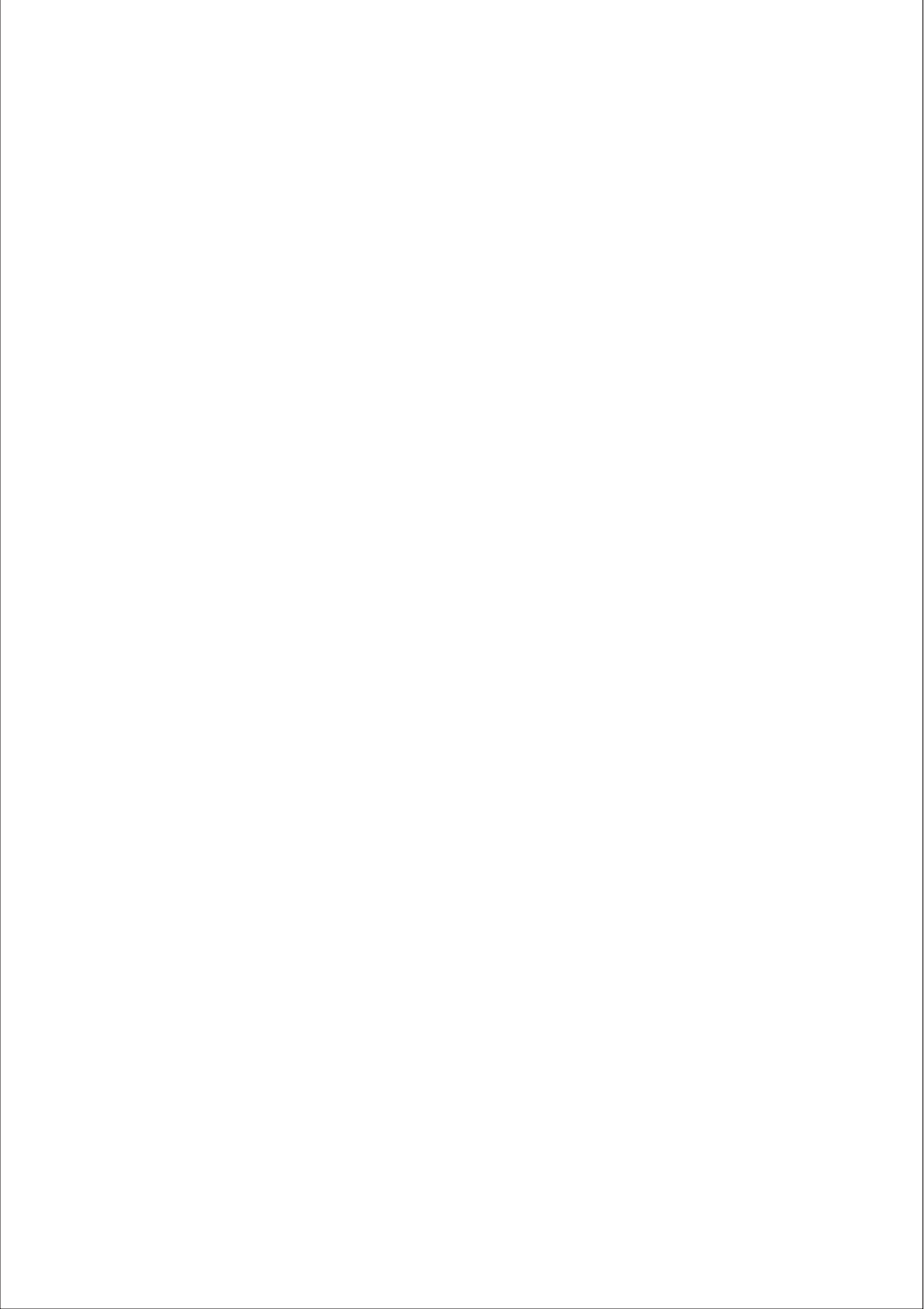
Postal Code: 214135

Tel.: 0086-510-8538 5330

Fax: 0086-510-8538 2358

Email: info@victorypower.com service@victorypower.com

Web: www.victorypower.com



Victory Power New Energy

www.victorypower.com

Add.: 1st Floor Area D, LI YE LOU, T-park, Wuxi New District, China

Postal Code: 214135

Tel.: 0086 - 510 - 8538 5330

Fax: 0086 - 510 - 8538 2358

Email: info@victorypower.com service@victorypower.com

VP-UMSC1.0.0EN

Wuxi Victory Power New Energy Technology Co., Ltd.